

REMARKS

Applicants wish to thank the examiner for the careful consideration given the present application as reflected in the Office action of December 26, 2008. The claims in the case have been carefully reviewed in light of the Office action and the amendments to certain of the claims submitted herewith and the remarks set forth below are presented based on that review.

In addition to amendments to certain of the claims, the specification has been amended. The amendments to the specification express features of the invention that are illustrated in the drawings and/or that are otherwise obvious to one skilled in the art based on a reading of the original specification. Consequently, the amendments to the specification do not constitute new matter.

Objection to the Claims

Claims 26 and 51 have been amended so as to conform to the requirements of 37 CFR 1.75(i).

Rejections Based on Prior Art

Claims 26 through 34, 36, 42 through 45, 47, 49, 51 through 55 and 57 through 61 have been rejected under 35 U.S.C. 103(a) as unpatentable over U.S. Patent No. 5,641,932 to Leins et al. (hereinafter referred to as “Leins”) in view of U.S. Patent No. 5,447,208 to Lund et al. (hereinafter referred to as “Lund”) and U.S. Patent No. 5,433,655 to Shiokawa et al. (hereinafter referred to as “Shiokawa”).

It is said in the last Office action that “[t]he Leins drill bit meets all the limitations of independent claims 26 and 51 except with those specifying a surface roughness for the drill bit of between 0.5 and 6 microns.” To satisfy that shortcoming, it is stated in the last Office action that “Lund et al, however, teaches that it is desirable for the cutting edges of drill bits to have a surface roughness of 10 μ or less (abstract) as such smooth cutting surfaces lower the friction at the cutting face, reduce adhesion of chips and reduces flaw sites in the cutting face (note column 3, line 65 – column 4, line 2).” It also is stated in the last Office action that “Shiokawa et al teach that such smooth cutting surfaces increase the accuracy of the surface being machined and increase the lifetime of the tool

(note abstract and column 5, lines 14-21.)” Based on these alleged disclosures and teachings of Leins, Lund and Shiokawa, it is concluded in the last Office action that “[t]o have constructed the Leins ceramic drill bit so that the surface roughness of the cutting edges was within the range claimed would have been obvious to one of ordinary skill in the art in view of the teachings by Lund et al and Shiokawa et al who teach that roughness within the range claimed are beneficial in improving the efficiency and lifetime of the tool.”

With respect to claims 26 and 51, Applicants respectfully submit that it would not have been obvious to one skilled in the art to adopt for the cutting edges of Leins a surface roughness in the range disclosed for the cutting elements of Lund. In the first place, Leins and Lund constitute non-analogous art. Leins is concerned with machine tools used in machining operations for producing machined parts (*see lines 6 through 16 of column 1 of Leins*) while Lund is concerned with rotary drag bits for earth boring (*see lines 8 through 25 of column 1 of Lund*). It would not be obvious to one skilled in the art that teachings applicable to drag bits for cutting through earthen formations could be adopted for machine tools used to manufacture machined parts. This is particularly true given the fact that the purpose in Lund of providing a smooth surface roughness to the cutting face 40 is to prevent chips cut from an earthen formation from building up ahead of the cutting face (*see lines 16 through 37 of column 4 of Lund*) and no such problem is present in Leins because Leins specifically provides a groove for shavings so that the shavings are readily removed. (*See lines 10 through 18 of column 2 of Leins*).

It is also submitted that modifying Leins by adopting the Lund teachings would be contrary to Leins teachings. That is, Leins, in lines 29 through 42 of column 1, highlights the differences that exist between ceramic tools and tools made of other materials such as high speed steel tools and hard metal tools. Thus, one skilled in the art, based on the Leins disclosure, would not be inclined to modify the tools of Leins based on disclosures that are related to non-ceramic tools such as the tools of Lund that are made of poly-crystalline diamond compacts.

Further with respect to the application of Leins and Lund to claims 26 and 51, even if these two references are combined as proposed in the last Office action, the resulting structure would not meet the limitations of claims 26 and 51. Thus, claims 26

and 51 recite that the cutting edge and/or toothings has a surface roughness of $0.5\text{ }\mu\text{m}$ to $6\text{ }\mu\text{m}$ which is equivalent to $127\text{ }\mu\text{in.}$ to $1524\text{ }\mu\text{in.}$ Lund, on the other hand, does not recommend a surface roughness of more than about $10\text{ }\mu\text{in.}$, more than an order of magnitude less than the lowest surface roughness claimed by applicants. In fact, Lund discourages adopting surface roughnesses as great as $20\text{ }\mu\text{in.}$ to $40\text{ }\mu\text{in.}$ which, of course, are substantially less than the surface roughnesses that are claimed.

The matter of surface roughness is an important aspect of Applicants' invention. Thus, as disclosed at page 2 of the specification of the present application, the surface roughness disclosed and claimed according to Applicants' invention increases the strength of the instruments. The occurrence of micro-cracks, which would lead to breakage and failure of the instrument is reliably prevented. This is particularly important in the case of instruments having small dimensions.

Moving on to a consideration of the rejection of claims 26 and 51 as being obvious over Leins in view of Shiokawa, Applicants respectfully disagree with the statement that "Shiokawa et al teach that such smooth cutting surfaces increase the accuracy of the surface being machined and increase the lifetime of the tool." What Shiokawa teaches is that a balance adjustment method for an end mill as illustrated in FIG. 4 of Shiokawa can result in a surface roughness as low as $0.2\text{ }\mu\text{m}$ to $0.3\text{ }\mu\text{m}$ in the part being machined, not in the end mill itself. Shiokawa has nothing at all to say concerning the surface roughness of a cutting tool. Therefore, combining the teachings of Leins and Shiokawa, even if it were obvious to do so, would not produce a structure as recited in claims 26 and 51. In any event, Applicants respectfully submit that it would not be obvious to combine the Leins and Shiokawa references because there is no teaching in Shiokawa that suggests applying his invention to ceramic instruments and, as noted above, modifying Leins by adopting the Shiokawa teachings would be contrary to Leins teachings. Thus, Leins discusses the differences that exist between ceramic tools and tools made of other materials and one skilled in the art, based on the Leins disclosure, would not be inclined to modify the tools of Leins based on disclosures that are related specifically to non-ceramic tools.

Further with respect to claim 51, that claim is limited to a dental instrument adapted to perform a dental procedure. Nowhere in the disclosures of Leins, Lund or

Shiokawa is there any reference to dental instruments adapted to perform a dental procedure.

As far as concerns the rejection of claims 27-34, 36, 42-45, 47, 49 and 52-55, because these claims are directly or indirectly dependent on one of claims 26 and 51, they are patentably distinguishable over either Leins in view of Lund or Leins in view Shiokawa for the same reasons as claims 26 and 51 are patentably distinguishable over those same combinations of references as discussed above. Additionally, independent claim 57, which incorporates the structure of claim 51, and claims 58-61, directly or indirectly dependent on claim 57, are patentably distinguishable over either Leins in view of Lund or Leins in view Shiokawa for the same reasons that claim 51 is patentably distinguishable over those same combinations of references as discussed above. Further, the following claims in this group of claims are additionally patentably distinguishable over either Leins in view of Lund or Leins in view of Shiokawa for the following reasons: claim 27 recites a range of surface roughnesses not disclosed by the references; claims 28, 29, 52 and 58 require the instrument to have form transitions not taught by the references; claims 30 through 33, 53 and 59 require a core reinforcement feature not disclosed in the references; claims 34, 54 and 60 call for a microhardened surface not taught by the references; claims 43 and 44 call for a metallic carrier not taught by the references; claim 45 provides that the tool is free of pores, a feature not taught by the references; claims 51 through 55 call for a dental instrument, a tool not taught by the references; and claims 57 through 61 recite a dental procedure not taught by the references.

Claims 26 through 29, 34, 36, 43, 45, 47, 51, 52, 54, 55, 57, 58, 60 and 61 also have been rejected as unpatentable under 35 U.S.C. 103(a) over U.S. Patent No. 6,319,108 to Adefris et al. (hereinafter referred to as "Adefris"). Independent claim 26 and claims 29, 34, 36, 43, 45 and 47, dependent on claim 26, as amended herein, require that the outer surface of the working member be configured to allow material cut away by the at least one cutting edge and/or tothing to proceed along the outer surface of the working member in a direction that extends generally along the axis of rotation of the shaft. No such structure is present in Adefris. The tool disclosed by Adefris is an abrading tool and would not provide for cuttings to be removed along the outer surface of

the tool in a direction that extends generally along the axis of rotation of the shaft to which the tool would be attached. Consequently, independent claim 26 and claims 29, 34, 36, 43, 45 and 47, dependent on claim 26, are patentably distinguishable over Adefris. As far as claims 51, 52, 54, 55, 57, 58, 60 and 61 are concerned, these claims are directed to a dental instrument or a dental procedure and Adefris contains no disclosure relevant to such an instrument or such a procedure. Therefore, these claims are patentable over Adefris. In addition, the following claims in this group of claims are also patentably distinguishable over Adefris for the following reasons: claims 26 and 27 recite a range of surface roughness not disclosed by the references; claims 28, 29, 52 and 58 require the instrument to have form transitions not taught by Adefris; claims 34, 54 and 60 call for a microhardened surface not taught by Adefris; and claim 43 calls for a metallic carrier not taught by Adefris; and claim 45 provides that the tool is free of pores, a feature not taught by Adefris.

Claims 37 through 41, 56, 62 and 63 have been rejected under 35 U.S.C. 103(a) as unpatentable over Leins in view of either Lund or Shiokawa, as those references have been applied to the claims as discussed above, and further in view of U.S. Pub. No. 2002/0028422. Claim 37 is directly dependent on claim 26 and claims 38 through 41 are directly dependent on claim 37. Consequently, claims 37 through 41 are patentably distinguishable over the cited references for the same reasons claim 26 is patentably distinguishable over those references as discussed above. Claims 38 and 39 are also patentably distinguishable over the cited references because the latter do not disclose that the depth mark called for by those claims has the range of surface roughnesses recited in the claims. Claim 40 is also patentably distinguishable over the cited references because the latter do not disclose that the depth mark is a laser mark as called for in claim 40. Claim 56 is directly dependent on claim 51 and, therefore, is patentably distinguishable over the cited references for the same reasons claim 51 is patentably distinguishable over Leins, Lund and Shiokawa, as discussed above. Claims 62 and 63 are directly dependent on claim 57 and patentably distinguish from Leins, Lund and Shiokawa for the same reasons as claim 57, as discussed above. Also, claim 63 calls for a procedure comprising one of the generation of bone cavities, the treatment of bones and the insertion of implants. None of these procedures is disclosed by the prior art applied to claim 63.

Therefore claim 63 is allowable.

Conclusion

It is respectfully submitted that the claims pending in the present application are patentable for the reasons set forth above, and the Examiner is respectfully requested to allow the claims and issue a notice of allowance. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 16-0820, our Order No. HOEF-37546.

Respectfully submitted,

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